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REMARKS

Pursuant to the present amendment, claims 1 and 26 have been amended and claims 2, 3, 4, 27, 28 and 29 have been canceled without prejudice. Specifically, claim 1 has been amended to include the feature claimed in its dependent claim 2. Likewise, claim 26 has been amended to include the feature claimed in its dependent claim 27. Accordingly, claims 1, 5-26, and 30-38 are pending in the present application. By way of the instant amendments, no new matter has been introduced. Reconsideration of the application in view of the amendments and remarks set forth herein is respectfully requested of the Examiner.

As an initial matter, Applicant notes that in the Office Action summary, it appears that the Examiner inadvertently indicated that claims 1-34 are pending in the application. However, further in the Office Action, the Examiner correctly indicates that claims 1-38 are pending in the present application. Applicant respectfully asserts that for at least reasons set forth below, pending claims 1, 5-26 and 30-38 are allowable.

Claims 1-38 stand rejected under obviousness type double patenting rejection over claims 1-19 of U.S. Patent No. 6,852,984. In the interest of expediency, Applicant has included herein a terminal disclaimer and respectfully request that the Examiner's rejection of claims 1-38 be withdrawn. However, it will be appreciated that the filing of the terminal disclaimer to obviate the Examiner's rejection is not an admission of the propriety of the rejection. *Quad Environmental Technologies vs. Union Sanitary District*, 946 F. 2d. 870 (Fed. Cir. 1991). See, e.g., MPEP § 804.03.

Claims 1-12 and 26-34 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by U.S. Patent No. 5,903,002 to *Turner, et al.* ("Turner"). An anticipating reference by definition must disclose every limitation of the rejected claim in the same relationship to one

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another as set forth in the claim. As amended, claim 1 now includes a feature from dependent claim 2 that the first and second conductive regions are formed on the sidewalls in a substantially opposing relationship. *Turner* does not teach or suggest an ion beam detector in which first and second conductive regions are formed on the sidewalls in a substantially opposing relationship. Based on the above-indicated legal standard, it is respectfully submitted that *Turner* fails to anticipate claim 1. Thus, claim 1 and claims dependent therefrom are in condition for allowance which is respectfully requested of the Examiner.

As described in the Applicant's specification throughout the present application, including on page 11, lines 16-24, a first conductive region 205A is formed on one of the sidewalls 203 and a second conductive region 205B may be formed substantially opposite to the first conductive region 205A. The conductive regions 205A and 205B may be electrically insulated from each other and also insulated with respect to a body 201 of a faraday cup form of an ion beam detector 200. Moreover, respective detection surfaces 206A and 206B may be formed on top of the conductive regions 205A and 205B. By forming the first and second conductive regions on the sidewalls in a substantially opposite relationship, an improved ion detection may be provided. On page 10, line 24 to page 11, line 7, for example, one illustrative embodiment describes that the angle of incidence with which an ion beam, or a small portion of an ion beam, impinges on a substrate may be monitored and adjusted. Such an ion detection system may enable accurate monitoring and detection of deviation regions of an ion beam or an ion beam portion from a desired direction with respect to the orientation of a target surface. With this understanding, it is respectfully submitted that claim 1 is not anticipated by the art of record.

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In contrast to the invention set forth in claim 1, *Turner* describes a faraday cup detector in which the three apertured plates 7, 8 and 9 are all positioned in front of a plate 10. The plate 10 is an aperture plate that is attached to the inner frame 3, which is further attached to sidewalls 6. The apertured plates 7, 8 and 9 are spaced apart by electrically insulating spacers 11. See col. 4, lines 25-32 and lines 41-45 in *Turner*.

However, *Turner* is completely silent with respect to the first and second conductive regions being formed on the sidewalls in a substantially opposing relationship. *Turner* is also silent with regard to two conductive regions being formed on the faraday cup body, wherein the first conductive region is electrically insulated from the second conductive region and having a first detection surface orientated along a first direction that is different from the second direction in which a second detection surface is orientated. Accordingly, *Turner* does not disclose or suggest the first and second conductive regions being formed on the side walls in a substantially opposing relationship, as claimed in claim 1.

For at least the aforementioned reasons, Applicant respectfully submits that the present invention is not anticipated by *Turner* and requests that the Examiner's rejection of claims 1-12 under 35 U.S.C. §102(b) be withdrawn.

In the Office Action, independent claim 26 has been rejected under 35 U.S.C. §102(b) as allegedly being anticipated by *Turner*. Applicant respectfully disagrees with the Examiner's rejections for at least the reasons set forth above in the context of claim 1.

As understood, *Turner* in Figures 1 and 2 describes three apertured plates 7-9. None of these apertured plates 7-9 teach or remotely suggest two conductive regions, electrically insulated from each other and having a detection surface oriented along a different direction such that the first and second conductive regions are formed on the sidewalls in a substantially

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opposing relationship. In fact, *Turner* is completely silent with regard to a faraday cup as set forth in amended claim 26.

Applicant respectfully submits that the apertured plates 7-9 described by *Turner* fails to teach or suggest a faraday cup in which a first and second conductive regions are formed on sidewalls in a substantially opposing relationship so that the first and second conductive regions can have a respective detection surface orientated along a different direction. As thus understood, it is respectfully submitted that independent claim 23 is not anticipated by *Turner* for at least the reasons set forth above.

In the Office Action mailed June 15, 2005, dependent claims 3-12 and 27-34 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by *Turner*. Applicant respectfully traverse's the Examiners §102 rejections. An anticipating reference by definition must disclose every limitation of the rejected claim in the same relationship to one another as set forth in the claim. As noted above, independent claim 1 has been amended to include the limitation of its dependent claim 2, and claim 26 has been amended to include the limitation of its dependent claim 27. Since independent claims 1 and 26 are allowable for at least the reasons set forth above, for this reason alone dependent claims 5-12 and 30-34 are not taught or suggested by *Turner*.

Claims 13-25 and 35-38 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,614,027 to *Iwasawa*, in view of U.S. Patent No. 4,816,693 to *Rathmell*. Applicant respectfully traverse's the rejection of claims 13-25 and 35-38.

As the Examiner well knows, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify

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the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991); M.P.E.P. § 2142. Moreover, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988); M.P.E.P. § 2143.03.

With respect to alleged obviousness, there must be something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561 (Fed. Cir. 1986). In fact, the absence of a suggestion to combine is dispositive in an obviousness determination. *Gambro Lundia AB v. Baxter Healthcare Corp.*, 110 F.3d 1573 (Fed. Cir. 1997). The mere fact that the prior art can be combined or modified does not make the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990); M.P.E.P. § 2143.01. The consistent criterion for determining obviousness is whether the prior art would have suggested to one of ordinary skill in the art that the process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art. Both the suggestion and the expectation of success must be founded in the prior art, not in the Applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991); *In re O'Farrell*, 853 F.2d 894 (Fed. Cir. 1988); M.P.E.P. § 2142.

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Applicant submits that the rejected claims 13-25 and 35-38 are not rendered obvious over *Iwasawa* and *Rathmell*, either considered alone or in combination. As discussed below, the Examiner concedes that *Iwasawa* fails to teach or suggest one or more limitations in independent claim 13. For example, the Examiner notes that *Iwasawa* fails to teach the use of angled conductive surfaces and adjusting energy and dopant ions, as recited in claim 21, and 35-38. Office Action at page 8. The Examiner relies on *Rathmell* to teach this limitation. However, *Rathmell* fails to teach or suggest use of angled conductive services and adjusting at least one two perimeter related to the beam characteristics of an ion beam on the basis of the subsequent sets of measurement readings from a plurality of faraday cups, each faraday cup being arranged relative to the ion beam so as to receive a portion of the ion beam. Furthermore, neither *Iwasawa* nor *Rathmell* provide any suggestion to modify or combine the prior art as suggested by the Examiner so as to arrive at Applicant's claimed invention.

In rejecting pending claims 13-25 and 35-38, the Examiner asserts that *Iwasawa* discloses an ion implantation apparatus, wherein the beam rate is measured using a plurality of faraday cups 48 and 46 positioned to collect ion current across the beam and generate a beam, as shown in Figure 3. The Examiner further notes that a beam collector 54 is then used to control divergence of the beam. Applicant respectfully disagrees with this reasoning since this assertion is not supported at all by the disclosure in *Iwasawa*.

Iwasawa is directed to controlling an electrostatic lens for converging/diverging an ion beam in an accelerating tube 8 that incorporates the electric static lens. *Iwasawa*, in Figure 5, describes and illustrates two sets of a plurality of faraday cups 40 and 46, both aligned in the same direction, i.e., the "x" direction. *Iwasawa* discloses that a front faraday unit 36 and a back faraday unit 44 are arranged for measurement of the ion beam and shaping of the sweeping away

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thereof. The front faraday unit 36 includes a front faraday array 38 consisting of a plurality of faraday cups 40 aligned in the "x" direction which is the scanning direction of the ion beam form. A faraday cup array 44 consists of a plurality of faraday cups 46 aligned in the "x" direction. See *Iwasawa*, col. 1, lines 65 to col. 2, line 5.

As thus understood, it is respectfully submitted that *Iwasawa* is completely silent as to obtaining subsequent sets of measurement readings from a plurality of faraday cups, each faraday cup being arranged relative to the ion beam so as to receive a portion of the ion beam. It is respectfully submitted that the two sets of beam currents measured by the front faraday array 38 and back faraday array 44, that is, the current measured by the front faraday array 38 consisting of a plurality of faraday cups 40 and the currents measured by the back faraday array 44 consisting of a plurality of faraday cups 46, are used to control electrostatic lens and ion implantation. See col. 2, lines 11-16 in *Iwasawa*. The beam currents measured by these front and back faraday arrays 38, 34 are taken into a waveform shaping controller 50 via a current transducer 48 which is a current measuring means. The relationship between the beam current measured by the current transducer 48 and the focusing voltage Vf exhibits a hill shape, as shown in Figure 7. The purpose of controlling the focusing voltage Vf is to acquire a large quantity of swept beam current at the position of the object-to-be-irradiated 22. See col. 3, lines 24-27 and lines 39-42.

In this way, *Iwasawa* discloses use of two sets of plurality of faraday cups 46, 40 for obtaining beam current measurements of the charged particle beams, such as ion beam in a scanning direction, where the two sets of faraday cups are not arranged relative to the ion beam so as to receive a portion of the ion beam. Thus, contrary to Examiner's assertion, *Iwasawa* at

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least fails to teach obtaining subsequent sets of measurement readings from a plurality of faraday cups being arranged relative to the ion beam to receive a portion of the ion beam.

Instead, in the Applicant's Specification, according to one illustrative embodiment discloses that a plurality of faraday cups, such as the cups 111, are provided and arranged across the area in which an ion beam is scanned across when processing a substrate, wherein the measurement readings of each cup are displayed to an operator substantially simultaneously. Figure 4A schematically depicts a representative example of measurement readings of a plurality of faraday cups which may be arranged in a single row. See Applicant's specification on page 21, lines 15-21.

With respect to claim 21, and claims 35-38, the Examiner asserts that *Iwasawa* as applied to claim 13 fails to teach the use of angled conductive surfaces and adjusting energy and dopant ions. The Examiner argues that *Rathmell* teaches this limitation. However, Applicant respectfully submits that the Examiner's reliance on the combination on *Iwasawa* and *Rathmell* is misplaced.

To establish a *prima facie* case of obviousness, there must be a teaching in the references that suggest the combination advanced by the Examiner. However, the Examiner provides no motivation other than a mere conclusory statement that it would be obvious to combine the references in the manners suggested. That is, the Examiner asserts that the ion implant control apparatus and method of *Iwasawa* can be modified to use the faraday cup of *Rathmell* to provide a tantalum cone design combined with the electron suppression to thereby provide accurate beam current measurements. It is respectfully submitted that the ion implantation dose control apparatus of *Iwasawa* does not teach or suggest use of a plurality of faraday cups. Instead, the position of faraday cup 17 or 18 is controlled by moving the faraday cup to one side of the beam

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path 19 or positioning the faraday cup 18 on the beam path on the other side of the beam path 19. Since *Rathmell* is completely silent with respect to even a suggestion to use a plurality of faraday cups, it is respectfully submitted that the combination of *Iwasawa* and *Rathmell* fails to present a *prima facie* case of obviousness with respect to claimed invention set forth in claim 13-25 and 35-38.

It is respectfully submitted that any attempt to assert that the inventions defined by independent claim 13, claims dependent therefrom, and claims 35-38 are rendered obvious in view of *Iwasawa* and *Rathmell* necessarily involves an improper use of hindsight using Applicant's disclosure as a roadmap. A recent Federal Circuit case makes it crystal clear that, in an obviousness situation, the prior art must disclose each and every element of the claimed invention, and that any motivation to combine or modify the prior art must be based upon a suggestion in the prior art. *In re Lee*, 61 U.S.P.Q.2d 143 (Fed. Cir. 2002). Conclusory statements regarding common knowledge and common sense are insufficient to support a finding of obviousness. *Id.* at 1434-35.

For at least these reasons, Applicant respectfully submits that the Examiner's obviousness rejection of claims 13-25 and 35-38 based on the combination of *Iwasawa* and *Rathmell* is improper. Accordingly, it is believed that independent claim 13, its dependent claims, and dependent claims 35-38 are in condition for immediate allowance.

In view of the foregoing, Applicant respectfully submits that all pending claims are in condition for allowance. The Examiner is invited to contact the undersigned at (713) 934-4055 with any questions, comments or suggestions relating to the referenced patent application.

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Respectfully submitted,

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